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ABSTRACT

Meta-analysis is a quantitative or statistical method for doing a literature review which replaces the traditional narrative method of reviewing literature. Statistics are taken from individual empirical studies and then statistical formulas are used to combine and test hypotheses. For feminist psychology, meta-analyses have usually been directed at the issue of gender differences. Meta-analyses have made and can continue to make contributions to the study of the psychology of women in these areas: (1) meta-analyses indicate psychological gender differences are small; (2) meta-analysis can be used to test the effect of sex of researchers on outcome of research; (3) validity in gender difference research can be addressed by meta-analysis; (4) meta-analysis can test competing theories and conceptualizations. Meta-analysis provides a healthy corrective to overestimation and overemphasis of psychological gender differences. (References are included.) (ABL)

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META-ANALYSIS: WHAT HAS IT DONE FOR FEMINIST PSYCHOLOGY?

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Paper presented at the Annual Convention of the American Psychological Association, 94th, Washington, DC, August 22-26, 1986.

Meta-Analysis: What Has It Done for Feminist Psychology?

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Abstract

Meta-analysis is a statistical method for performing a literature review. In psychology of women, meta-analysis can assess the magnitude of gender differences in a wide variety of psychological characteristics, reviewing hundreds of studies on each characteristic. Meta-analyses of gender differences in verbal ability, mathematical ability, and spatial ability, gender differences in attributions for success and failure, gender differences in nonverbal behaviors such as smiling, gender differences in aggression, gender differences in conformity, and gender differences in helping behavior have all been reported. Generally, the results indicate that psychological gender differences are rather small. Meta-analysis can also be useful in examining methodological issues in psychology of women (e.g., construct validity) and in testing competing theories in psychology of women.

Paper presented at the annual meeting of the American Psychological Association, Washington, D.C., August, 1986

~~What Has~~ Meta-Analysis: What Has It Done for Feminist Psychology?*

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In the title of my presentation, I pose a rather hostile question to myself: So what has meta-analysis done for feminist psychology? I began my first meta-analysis in 1979, and so I have devoted 7 years of my research life to working on this technique. I must be either very courageous or very foolish to attempt to answer such a question honestly. Let me begin by explaining what meta-analysis is, for those who are not familiar with it; then I will articulate what things I think it can and has accomplished for feminist psychology; and finally I will try to assess whether those things are worth accomplishing.

What is meta-analysis?

I like to think of meta-analysis as being a quantitative or statistical technique for doing a literature review. As such, it replaces the traditional "narrative" method of reviewing literature, in which the researcher reads a large number of empirical studies and forms an impression of the general trends in their findings. The narrative review is subject to obvious problems of bias. Meta-analysis, in contrast, because it is quantitative, is more objective. Further, it allows one to integrate massive numbers of studies--say 100 or more--a task that would exceed the information-processing capacity of a human reviewer performing a narrative review.

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In doing a meta-analysis, one takes the statistics from each of the individual empirical studies that have been gathered and then uses statistical formulas to combine them and test hypotheses. These techniques can be used in any content area. For example, one of the first and certainly most controversial meta-analyses was of the outcome of psychotherapy (Smith & Glass, 1977). In feminist psychology, meta-analyses have usually been directed at the issue of gender differences--whether in abilities, aggressiveness, causal attributions, or helping behaviors (Hyde & Linn, 1986).

The statistic that has been used most frequently in meta-analysis is the effect size

$$\underline{d} = \frac{\bar{X}_F - \bar{X}_M}{SD_w}$$

where $\bar{X}_F$ is the mean for females, $\bar{X}_M$ is the mean for males, and SD_w is a pooled within-group standard deviation. The reviewer tries to get a value of $\underline{d}$ for each study and then uses formulas to average the values to obtain an estimate of $\underline{d}$ over all studies. At least four texts on meta-analysis are now available (Glass et al., 1981; Hunter et al., 1982; Hedges & Olkin, 1985; Rosenthal, 1984). I particularly recommend a chapter by Hedges and Becker (1986) for those wanting a very readable explanation.

Statistical methods pioneered by Larry Hedges also allow one to test for variability in $\underline{d}$ or for trends in the effect size $\underline{d}$ across studies. For example, in a meta-analysis of gender differences in aggressive behavior, I was able to test for age trends by comparing the magnitude of $\underline{d}$ in studies with younger subjects and studies with older subjects. I found that gender

differences were significantly larger for younger subjects, particularly preschoolers.

What can meta-analysis do for the psychology of women?

There are some glamor areas in the psychology of women--e.g., developing new therapies for battered women or for their batterers. Meta-analysis is not one of the glamor areas. Nonetheless, I think that meta-analysis can make and has made some contributions, which I list here as outcomes.

Outcome 1: An analysis of the statistical significance and magnitude of gender differences in a wide variety of psychological characteristics. Meta-analyses of the following have been reported: gender differences in verbal ability, mathematical ability, and spatial ability (Hyde, 1981; Linn & Petersen, 1985), gender differences in attributions for success and failure (Whitley et al., 1986), gender differences in nonverbal behaviors including smiling and gazing and decoding of nonverbal cues (Hall, 1984), aggression (Hyde, 1984; Eagly & Steffen, in press), gender differences in influenceability and conformity (Eagly & Carli, 1981), gender differences in helping behavior (Eagly & Crowley, in press), and others that would make my list too long.

At the risk of overgeneralization, I would conclude that these meta-analyses, taken together, indicate that psychological gender differences are generally small, and probably much smaller than one would think given the discussions of them in introductory psychology texts. One of the most striking findings--given the way we talked a decade ago about males making internal attributions of success and females making internal attributions of failures--is the finding of Irene Frieze and her colleagues that the magnitude of the gender

difference for several patterns of attributions is close to zero (Whitley et al., 1986). Even the gender difference in aggression has a value of d of only about 0.50, or half a standard deviation (Hyde, 1984).

Outcome 2: An examination of methodological issues in psychology in general and in the psychology of women in particular. Let me give two examples. Feminist psychologists have pointed out the potential effect of the sex of the researcher on the outcome of research. Meta-analysis allows one to test for the significance and magnitude of such an effect over an array of studies. For example, Alice Eagly and Linda Carli (1981) found that male researchers obtained larger differences in conformity--women being more conforming--than did female researchers. Because their research reviewed a large number of studies, their conclusions are more convincing than would be a single study that found an effect of the sex of the experimenter.

Alice Eagly (1986) has provided a second example of a methodological issue that can be addressed by meta-analysis. She argues that issues of validity (e.g., construct validity, external validity) in gender-difference research can be addressed by meta-analysis. In regard to construct validity, a conclusion based on a meta-analysis should have more validity than a conclusion based on a single study because the meta-analysis has cumulated findings over many studies and thus over many operationalizations of the construct. On the other hand, the meta-analysis cannot create validity from an entire body of research that lacks validity. For example, if all research on aggression with adult subjects uses the Buss shock paradigm, meta-analysis cannot overcome the limitations of this single operationalization of the construct "aggression." A law I learned as a graduate student (about factor analysis) applies here: "Garbage in, garbage

out."

Outcome 3: Testing of competing theories and conceptualizations. As we move into a sophisticated second generation of research on the psychology of women, we increasingly will have two or more psychological theories or feminist theories competing to explain a phenomenon. Meta-analysis can be useful in deciding which of the theories is superior. For example, Eagly and Crowley (in press) have distinguished between social-role theories and status/dominance theories and then tested their predictions for gender differences in helping behaviors using meta-analysis.

As a second example, Taylor and Hall (1982) have pointed out that several different conceptualizations of androgyny exist concurrently in the literature; they use meta-analysis to test the alternative predictions of these conceptualizations for the relation of androgyny and self-esteem.

Is meta-analysis worth doing?

Despite some limitations to the method, I think that meta-analysis in the psychology of women is worth pursuing for two reasons. First, the sex differences tradition in psychology is a long and often a malevolent one; it must constantly be kept in check. A century ago, researchers argued that women's skulls, and therefore their brains, were smaller than men's, and thus women's intellectual abilities could be expected to be less. Jacqueline Eccles finds that today, reports of lesser female mathematical ability in a highly selected sample of mathematically gifted adolescents (Benbow & Stanley, 1980) lead parents across the country to reduce their estimates of their daughters' mathematical ability. Meta-analysis provides a healthy corrective to an

overemphasis on and overestimation of psychological gender differences. Second, psychology of women must and is moving into a sophisticated second generation of research. We must consider issues of validity and we must test competing theories. Meta-analysis can help us to do both.

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